Butte, MT – Air Quality Monitoring & Studies Fact Sheet

The following documents historic and ongoing efforts to characterize the air quality related to the presence and impacts of particulate matter pollution in the Community of Butte, Montana.

- DEQ Air Quality Bureau's Ambient Air Monitoring Program has been active in air quality sampling/monitoring for particulate in and around the community of Butte since the early 1960's; initially as the Department of Health and Environmental Services. Table 1, below, details past and current monitoring by the DEQ.

- Montana Resources operated several industrial monitors as late as 2002. Table 1 summarizes those monitoring efforts.

- Multiple air quality related studies are noted with focus on the presence, distribution and source(s) of particulate pollution within the Butte Airshed. Table 2 lists those studies where DEQ's ambient monitoring data was utilized; or those studies in which the DEQ participated at some level. This list does not comprehensively identify all available studies and/or research relevant in the potential assessment of air quality impacts in Butte.

Table 1 – Ambient Air Monitoring Activities

| Timeframe | Parameter(s) | Operator | Summary |
|---|---|---|---|
| 1992-2002 | PM-10 - Metals | Montana Resources | Industrial monitoring network operated under MAQP #1749. PM-10 mass, Pb, Cu only |
| 1984-1991 | TSP - Metals | Montana Resources | TSP Mass and specified metals at multiple sites in Butte. Parameters included; As, Cd, Pb, Zn, Mo |
| 1985-current | PM-10 | DEQ, Air Quality Bureau | PM-10 Mass; Greeley School Site. Filter-based gravimetric method producing a 24-hour average concentration; 1985 through 1993. Continuous TEOM method producing a 1-hour average concentration; 1993 through 2004. Continuous BAM method producing a 1-hour average concentration; 2004 to current. |
| 1999-current | PM-2.5 | DEQ, Air Quality Bureau | PM-2.5 Mass; Greeley School Site. Filter-based gravimetric method producing a 24-hour average concentration; 1999 through 2010. Continuous BAM method producing a 1-hour average concentration; 2010 to current. |
| 2008-current | PM-2.5 speciation | DEQ, Air Quality Bureau | Speciated filter-based sampling for specified elements, major ions, and carbon on a 1 in 6 day schedule; Greeley School Site. Parameters include; Sb, As, Ba, Br, Cd, Ca, Cr, Co, Cu, Cl, Ce, Cs, Eu, Ga, Fe, Hf, Ir, Mo, Mn, Mg, Hg, Ni, Au, La, Nb, P, Se, Sn, Ti, Sm, Sc, V, Si, Ag, Zn, Sr, S, Ta, Tb, Rb, K, Yb, Na, Zr, W, major ions (choride, ammonium, sodium, potassium, total nitrate, sulfate, elemental carbon, and organic carbon. Eu, Ga, Hf, Ir, Mo, Hg, Au, La, Nb, Sm, Sc, Ta, Tb, Yb, W were phased on of analysis in February 2009. |
| 1962-1983 | TSP – Metals/Ions | DEQ, Air Quality Bureau | Filter-based gravimetric method for TSP Mass, metals and ions sampling at multiple sites. Last sampler operated at Greeley School site (1971-1983). Parameters included; benzene soluble organics, Al, Sb, As, Cd, Cr, Cu, Fe, Pb, Mn, Ni, V, Zn, Nitrate & Sulfate. |

Table 2 – Air Quality Related Studies

| Study Timeframe | Title | Report Date | Source | Summary |
|---|---|---|---|---|
| 1981 | Particulate Emission Micro-inventories for Greeley School and Kaw Avenue Particulate Monitoring Stations in Butte, MT. | August 20, 1981 | Air Sciences Inc | Inventory of particulate emissions from a 1-mile radius around Greely School and Kaw Ave. micro areas in Butte. |
| 1981 | Montana Air Pollution Study. Air Quality Data Summaries for Anaconda-Butte, Billings, Missoula, Columbia Falls, Hardin, East Helena, and Colstrip. | February 1981 | DHES, Air Quality Bureau | Report summary of monitoring data various pollutants including TSP. |
| 1982 | Summary of Particulate Studies for Butte, MT. | May 1982 | Air Sciences Inc | Report summary of ambient data and various air quality analyses resulting in a technical summary for the Butte TSP standard. Report also includes meteorology, source impacts, and emission estimates via source / receptor measurements. |
| 1982 | TSP Source Apportionment in Butte, MT using the DDMB Receptor Model | January 1, 1982 | TRC | Report analyzing TSP emissions using the dispersion dictated mass balance (DDMB) receptor model to compute source apportionment and TSP emissions for 1978. . |
| 1982 | Butte Source Apportionment Study – Chemical Mass Balance | November 1982 | DHES, Air Quality Bureau | Summer time TSP source apportionment study - chemical mass balance. Greeley School, Hebgen Park, and Alpine site. |
| 1988 | Residential Wood Stove Survey for Butte, MT | May 1988 | MT College of Mineral Science & Technology; Ganesan | Estimation of PM-10 emissions from residential wood stoves using a spatial grid inventory and telephone survey techniques for areas in and around Butte and Walkerville |

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| 1988-1989 | PM-10 Chemical Mass Balance Study for Butte, Montana | April 1989 | DHES, Air Quality Bureau | Winter time PM-10 & PM-15 source apportionment study-chemical mass balance. Greeley and Alpine Sites |
| 1990 | Butte – PM-10 Optical Study Final Report Air Quality Bureau PM-10 / CO / SIP / TIP Development Assistance in MT. | February 15, 1990 | Bison Engineering | Report on optical microscopy from the analysis of twenty quartz PM-10 filters to determine source contribution. Collected from Greeley School monitoring station. |
| 1991 | Butte PM-10 Emission Inventory. | March 1991 | DHES, Air Quality Bureau | A DHES-AQB report of PM-10 emissions from the Butte area in support of the state implementation plan and verification tool for receptor modeling. Contains tables of emissions by source category by spatial distributions. |
| 2001 | ATSDR Health Consultation | June 25, 2001 | CDC-ATSDR | ATSDR report in response to the Yankee Doodle Tailing. Samples provided by MT DEQ. |
| Winter 2007-2008 | The Butte, Montana PM2.5 Source Apportionment Research Study | 11/17/2008 | U of M, Center for Environmental Health Sciences; T. Ward | PM-2.5 Source Apportionment Study – Chemical Mass Balance at the Greeley site |
| Winter 2007-2008 | Spatial Comparison Study | N/A | DEQ, Air Quality Bureau | Study to confirm that the Greeley site represented the highest concentration of PM-2.5 in Butte. Sampling occurred at the Stodden Park, Front Street and Airport Sites. |
| Winter 2012-2013 | The Butte, Montana PM2.5 Source Apportionment Research Study | July 1, 2013 | U of M, Center for Environmental Health Sciences; T. Ward | PM-2.5 Source Apportionment Study – Chemical Mass Balance |
| Summer 2013 | The Butte, Montana PM2.5 Source Apportionment Research Study - Summer 2013 | January 4, 2014 | U of M, Center for Environmental Health Sciences; T. Ward | PM-2.5 Source Apportionment Study – Chemical Mass Balance at the Greeley site |
| 2014 | An Assessment of Ambient Particulates in Butte, Montana | January 6, 2014 | Energy and Environmental Research & Technology, LLC; Dr. Ganesan | Review and assessment of existing PM-2.5 & PM-10 sample results |
| Winter 2012-2013; Winter 2013-2014 | Spatial Comparison Study | N/A | DEQ, Air Quality Bureau | Study to analyze the differences in ambient concentrations of PM-2.5 and meteorology across different spatial locations for the purpose of articulating airshed characteristics and ambient concentrations of PM-2.5 from Greeley School. Monitoring was performed at six temporary sites. |
| 2013 | Field Sampling – Yankee Doodle Tailings Impoundment | | DEQ, Air Quality Bureau & MBMG | Sample and analysis of soils to identify the composition of material from the Yankee Doodle Tailings impoundment and tailings dam. |